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THE FOOD OF BIRDS.

By T. M. BREWER.

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mine obliges me to concede leadership to you, Iron-leg. Arrogance is your greatness—and great it is as the world goes; for by that you have the most skillful, the strongest, the most gifted hands in the community where you reside to turn your grindstone. Imputed talents show in you fruits like real ones do in others, because you conduct a kind of presidency over the riches of other minds, and even claim that doing so is exercising the highest talent of all. Grant you, Iron-leg, it is the talent of kings and rulers; but you will never get a presidency over the intellectual progeny of the tramping old star-gazing bachelor, whose legs I saw a while ago, nor over the poet's song, the painter's pencil, or the philosopher's microscope. You—

Bless me! Here is my coffee and toast, cold as a dog's nose! Now I must be after my own legs.

THE FOOD OF BIRDS.

"HOW rich our Lord God must be!" says Martin Luther in his Table-Talk; "I do verily believe that to feed the sparrows in Germany costs Him more than all the revenue of the King of France."

What do all the birds eat? Where do they all find food enough to support their own lives and the lives of their young? These are questions which are continually coming up in every-day life, together with that other set of reproachful queries as to why the birds don't eat up the caterpillars and canker-worms, and let alone cherries and strawberries. In view of the very general interest which attaches to the matter, and of the frequency with which the above-mentioned questions are asked, it seems strange that so small an amount of organized knowledge bearing upon this subject has as yet been collected.

As to the large amount of food which some birds are capable of absorbing there is a set of thoroughly scientific experiments by Professor Treadwell, of Cambridge, upon the young of the American robin. A couple of vigorous, half-grown birds having been selected in the early part of June, the Professor began to feed them with earth-worms, giving three of these to each bird the first night; next day he gave them ten worms each, which they ate ravenously; but thinking this quantity of food to be greater than that which could naturally be supplied by their parents he limited the birds to this allowance. On the third day he gave to each bird eight worms in the forenoon; but in the afternoon he found one of them becoming feeble, and soon after it refused food and died; on opening it, he found the crop, gizzard, and intestines entirely empty, and concluded therefore that it had died from want of sufficient food, the effect of hunger being perhaps increased by cold, as the thermometer was only about 60°. The other bird, still vigorous, he put in a warmer place, and increased its food, giving it the third day fifteen worms, on the fourth day twenty-four, on the fifth twenty-five, on the sixth thirty, and on the seventh thirty-one worms. These quantities, however, seemed to be insufficient, and, as the bird appeared to be losing plumpness and weight, the Professor began to weigh both the bird and its food, and to tabulate the results of these weighings. By this table it appears that though the food was increased to forty worms, weighing twenty pennyweights, on the eleventh day the weight of the bird rather fell off, and it was not until the fourteenth day when the bird ate sixty-eight worms, weighing thirty-four pennyweights, that his weight began to increase. On this day the weight of the bird was twenty-four pennyweights; he therefore ate forty-one per cent. more than his own weight in twelve hours; weighing after it twenty-nine pennyweights, or fifteen per cent. less than the food he had eaten in that time. On the fifteenth day a small quantity of raw meat was offered to the bird, and it being found that this was readily eaten it was afterward employed to the gradual exclusion of worms.

As an offset to the objection that the earth-worm contains but a small amount of solid nutritious matter, the bird was fed upon the twenty-seventh day exclusively on clear beef, in quantity twenty-three pennyweights; at night the bird weighed fifty-two pennyweights, this being but little more than twice the amount of flesh consumed during the day, no account being taken of the water, earth, and gravel, of which large quantities were daily swallowed. This presents a wonderful contrast with the amount of food required by the cold-blooded vertebrates, fishes, and reptiles, many of which can live for months without food, and also with that required by mammalia. A man at this rate should eat about seventy pounds of flesh per day, and drink five or six gallons of water.

With regard to the question, how can this immense amount of food required by the young birds be supplied by the parents? Professor Treadwell enters into the following computation: Suppose a pair of old robins with the usual number of four young ones, these would daily require, according to the consumption of the bird subjected to experiment, two hundred and fifty worms, or their equivalent in insects or other food; suppose the parents to work ten hours, or six hundred minutes, to procure this supply; this would be a worm in every two and four tenth's minutes; or each parent must procure a worm or its equivalent in less than five minutes during ten hours, in addition to the food required for its own support. But after all the Professor is compelled to confess his inability to reconcile the calculation with actual observation of robins, which he has never seen return to their nests oftener than once in ten minutes.

The bird experimented upon by Professor Treadwell attained its full size on the thirty-second day after having been captured, after which time it ceased to increase in weight; its diet from this time on amounted on the average

to eighteen pennyweights of beef or thirty-six pennyweights of earth-worms per day. From the fact that the bird thus continued in its confinement, with certainly much less exercise than in the wild state, to eat one-third of its weight of clear flesh daily, the Professor concludes that the food consumed by it when young was not much more than must always be provided by the parents of wild birds.

But it is more particularly with regard to the *quality* of the food of birds that we know so little. In the pewee and the king-bird the naturalist sees a couple of large "fly-catchers," of exceedingly interesting habits, to which the largest courtesies should be extended; while in the eyes of many farmers these birds are simply malevolent destroyers of bees; and it may well be possible that, by destroying insectivorous insects as well as bees, these birds really do more harm than good, looking of course from the lowest utilitarian point of view.

Everybody is aware that the crow eats a few grains of corn at the time of planting, and that the robin eats cherries and strawberries with avidity when these are to be had, but what do most of us know of the food of the crow, or of the robin, during the other fifty weeks of the year, more than that the latter is occasionally to be seen regaling himself upon earth-worms and the former upon carrion? that the contents of the stomachs of a dozen or two of crows have been examined and recorded by naturalists? and that the species is accused of sucking the eggs and destroying the young of various small birds which nest upon the ground? By the standard works upon Ornithology we are told that the crow devours insects, grubs, worms; that he destroys mice, moles, and other small quadrupeds; and that he will eat snakes, frogs, and the like, as well as fruits, seeds, and vegetables. But the testimony is so meagre that we may well pause to question its worth when called to sit in judgment upon the moot question whether or no, year in year out, the crow does commit more of good than of evil as regards mankind.

Then there is the cherry-bird, with his striking traits of beauty, beneficence, and evil, to-day sweeping away the canker-worms as with fire and sword; and to-morrow cleaning out the cherry-trees as effectually as if a flight of locusts had passed over the land; and again, a few months later, feasting upon the cedar-berries in the same reckless way. And yet how little do we really know of the ordinary food of the cherry-bird; for with the foregoing items we have accounted for only three or four weeks of his yearly life. It is note-worthy, by-the-way, that, with the Baltimore oriole, the cherry-bird is one of the very few members of the feathered tribe which will greedily eat the hairy caterpillars which infest our orchard trees.

The American goldfinch, or black-winged yellow-bird, with his notorious liking for the seeds of dandelions, lettuce, and the thistle, can be followed through a month or two, and some of the vireos and wood-warblers no doubt find an abundance of moths and other insects to supply their wants; while the dietary of the various woodpeckers seems to be tolerably well understood, though it has lately been asked by a distinguished ornithologist whether, after all, the country boy's name, "sap-sucker," as applied to some of the woodpeckers, is altogether a misnomer?

But how is it with the swallows? Take the hardy "white-bellied swallow" (*Hirundo bicolor*) for an example, as he follows the sun northward with a seemingly most indiscreet haste. What does he find stirring in the insect line during the first days of his arrival? What do the blue-birds eat from day to day during their long sojourn? And so on with all the rest.

With regard to the robin all these questions have been answered very satisfactorily—at least in so far as a single locality is concerned—by Professor Jenks, of Middleborough, Massachusetts, whose very interesting report to the Massachusetts Horticultural Society will be found in the published Journal of that Association. Professor Jenks, having determined to make the food of the robin a subject of special investigation throughout an entire year, in order that some positive conclusion might be arrived at in reference to the utility of this bird to the horticulturist, adopted the following plan of investigation: (1.) to obtain birds at daybreak, mid-day, and sunset; (2.) to obtain birds from both the village and the country; and (3.) to preserve in alcohol the contents of each gizzard. Beginning with the first week of March, 1858, specimens were actually examined at least weekly, and most of the time daily, to December, and during the winter months at least semi-monthly.

As far as the specimens procured at daybreak were concerned no positive information seems to have been obtained, since the gizzards of these are represented to have been either entirely empty or but partially distended with well-macerated food. But the birds killed in the latter part of the day were uniformly filled with food which had been only recently taken. Numbers of male robins made their appearance at Middleborough early in March, but it was not until the second week in April that any female birds were noticed. From the early part of March up to the first of May not a particle of vegetable matter was found in the gizzard of a single bird. Nine-tenths of the whole mass of food examined during this period consisted of a single kind of larva, the *Bibio albipennis*, of Say, though a great variety of other insects in all stages of growth and development were also met with. Of the larva in question from one to two hundred specimens were frequently taken from a single gizzard, and usually when this larva was found it was the only food in the stomach. During the month of May the *Bibio* larva entirely disappeared from the gizzards, being replaced, up to the 21st of June, by a variety of insects, or worms only, including spiders, caterpillars, and beetles of the

family *Elateridæ*, the parents of the well-known wire-worm so destructive to corn and various seeds at the time of planting.

The earth-worm, though a favorite food for the young bird, was found to be eaten but sparingly by the adult. After the 21st of June the Professor began to find strawberries, cherries, and other pulpy fruits, though these were still mixed with insects in the majority of instances; birds captured at a distance from gardens and fruit trees having less fruit and a larger number of insects in their gizzards than those taken near the village, the robin not being an extensive forager. This mixed diet continued from the ripening of the strawberries and cherries until October, the vegetable portion consisting, during August and September, in great part of elder-berries and poke-berries. During the month of October the vegetable diet wholly disappeared, its place being supplied by grasshoppers and other orthopterous insects. Early in November the robins which have passed the summer among us migrate southward—the few immigrants from the north, which are seen by us during the winter months, managing at that time to eke out a miserable existence upon bay-berries, privet-berries, and juniper-berries.

Somewhat similar in conception to the researches of Professor Jenks, though of much wider scope, are those to which M. Florent Prevost has devoted himself in France. As one of the naturalists in charge of the famous collections at the Garden of Plants in Paris this observer has had a peculiarly good opportunity to study the question now under discussion. During nearly thirty years he has taken pains to collect and preserve the contents of the stomachs of all the birds which have been brought to the Museum, to say nothing of large numbers of specimens procured specially by himself and by the foresters of numerous public and private estates who have interested themselves in his behalf.

It is to be regretted that the complete details of M. Prevost's researches have not been published. As yet we have only an abstract of his results, and the promise of a circumstantial account of his studies at some future day. Among the more note-worthy of M. Prevost's conclusions may be mentioned the fact that the food of birds varies according to the age of the bird as well as according to the season of the year—the observation of Professor Jenks, that earth-worms are eaten by young but not by old robins, being evidently nothing more than the particular case of a general law. M. Prevost has ascertained also that the young of the greater number of granivorous birds are really fed upon insects, and that even the adults themselves are insectivorous during the breeding-season. A familiar instance of which we have in this country the common chipping sparrow; and the same remark applies to those species of birds which in early spring devour the buds and young leaves of trees. It was found also that there are but few of the birds of prey—even those which are most truly carnivorous—which do not at times partake of insects as food.

The more carefully one studies the subject, so much the more astonishing does the place which is occupied by insects in the alimentation of birds appear. As every one knows, there are stated seasons of the year when certain kinds of insects make their appearance in large numbers, and at these times it would almost seem that the very abundance of this food induced the birds to partake of it. For example, during the interval when the June-bug is abundant portions of this insect can be found in the stomachs of the greater number of the birds which inhabit France at that season of the year; and the beetle in question is then found also in the stomachs of many quadrupeds, from the little shrew-mouse up to the wolf.

M. Prevost asserts his ability to demonstrate, so soon as the details of his researches are made public, that birds are in general much more useful than hurtful to the husbandman, and that even the damage committed at certain moments by the grain-eaters proper is largely compensated for at other times by the consumption of insects by these very birds. He insists, moreover, upon the necessity of seeking for new methods of protecting those crops which are liable to be injured by the feathered race, instead of resorting, as now, to the suicidal policy of destroying or seeking to destroy the latter.

The influence of food in determining the vagabond life which is led by many kinds of birds is remarkable. While some animals, without change of habitation, make out to obtain nourishment throughout the year by resorting to different kinds of food according to the season, others confine themselves exclusively to such aliments as can be obtained only under peculiar conditions of climate, their food being found only at stated periods in any one country. Now, in the case of quadrupeds, when a given species can not adapt itself to changing circumstances, can not obtain continuously the food suitable for its maintenance, hibernation is the usual resource: the animal simply sleeps through the unfavorable season. But with birds this curious phenomenon of hibernation does not occur—at least naturalists have not been able to detect any evidence of its existence; not even enough to account for the widely-spread popular belief or prejudice that swallows pass the winter in the mud of ponds; but instead of that, and equally dependent upon the question of nourishment, we have the still more remarkable phenomenon of migration, when, following the calls of hunger, the feathered myriads pass to and fro over the countries of the earth.

One curious point noticed by M. Prevost furnishes a remarkable contrast to the insatiable hunger and lack of endurance exhibited by the young robins of Professor Treadwell: it is, that some species of birds are capable, at certain epochs, of living for a long time without food, their stomachs being found to contain at these seasons no alimentary matter whatsoever, but

only indigestible substances, such as, most commonly, the feathers of the bird itself in the form of large balls, the purpose of which appears to be to keep the stomach distended. This peculiarity was frequently observed in the various species of grebes, in the winter months, during the prevalence of frost.

It is undeniable that the results obtained by the naturalists above-mentioned are exceedingly valuable; but they serve only the more clearly to indicate the need of a more humane, a more manageable method of inquiry. There are few persons so situated that they could study the subject in the style of M. Prevost, and there are many who would shrink from the wholesale slaughter which is unavoidable in the system of Professor Jenks. What is needed is a method of research which shall not involve the destruction of the bird in order that we may examine the things which are put into its stomach. There is, of course, the familiar method of noting every particular instance in which birds are seen feeding upon any thing the character of which can be well ascertained. The method, if it were perseveringly carried out by a number of different observers, working in connection with each other, and all reporting to a common centre, would undoubtedly lead to valuable results. But besides this there presents itself another plan which, though applying, it is true, to only a portion of the breeding-season, could be so easily carried out that it would seem to be worthy of careful trial. This consists merely of a modification of the school-boy's system of rearing young birds through the intervention of the parent birds. The nest and young birds therein contained being placed within a wire cage, this is left hanging upon the tree from which the nest was taken, so that the parent birds can feed their offspring through the bars of the cage. This they will soon proceed to do, and in a short time will labor for the support of the young birds as tranquilly as if nothing had happened. Now to any one who has ever seen this method put in practice, and has noticed the heedless way in which the young birds push and crowd one another about whenever the parent comes to distribute food among them, it will be evident that there would be little or no difficulty in so arranging matters that a portion of the food proffered by the old birds should fall, not into the open mouths of their offspring, but into the bottom of the cage, whence it could be taken for examination at the convenience of the observer. Little if any thing more would be needed than to so adjust the position of the nest within the cage that the young birds could neither have access to the sides of the cage, nor be able to reach completely to its upper bars; and in case the food consisted of living insects, some adhesive coating, like glycerin, for example, would of course be needed at the bottom of the cage.

Now taking, for the sake of example, the one hundred and seventy species of land-birds which are enumerated in the Report on the Ornithology of Massachusetts, there are probably at least sixty per cent. of these, the habits of which, as regards food, could be thoroughly made out in a few years by a combination of the methods of research last mentioned, and by the united observations of several contemporaneous observers at different stations. Of the very general interest which would attach to a fund of knowledge of this description, and of its great importance, not only to the husbandman, but to all lovers of nature, there can be no question.

Is it too much to hope that in this land, where all men are familiar with the value of co-operation and accustomed to the conduct of Societies, there may not be one day established an Association for the Advancement of Knowledge which shall be truly in harmony with the spirit of the times in which we live? Such a Society, possessing somewhere a central office or bureau in charge of competent officers, and sending out ramifications into all sections of our common country, so that it could number among its active members every person of observant habits and scientific tastes throughout the length and breadth of the land, would quickly settle a host of questions, like this of the food of birds, which are too large to be grasped by a single man.

EDUCATION OF THE COLORED POPULATION OF LOUISIANA.

ONLY a few years elapsed after the settlement of Louisiana in 1699 by the French, before slave labor was introduced to aid in developing its resources and sustaining the colonists. For a century and a half since that period has the contest between freedom and slavery been waged there, and always under circumstances favorable to the latter. In many of the English colonies along the Atlantic coast loud and repeated remonstrances, until the era of the Revolution, were made to the mother country against the introduction of this element among the population; but in the early history of Louisiana we find that no systematic opposition was made to the use of slaves, or apprehension of future evils by their presence. The early governors welcomed slavery as the only means of causing prosperity to visit their country, and the whole moral and political influence of the people was in favor of its general adoption as a part of the political economy of the country. The monarchs of France regarded slavery as a proper element of industry in their colonies, and as long as their revenues were increased by the slave-trade they saw nothing but humanity and civilization in its practice.

The early history of this State blends the sober realities of truth with the poetry and romance of the Middle Ages. The chivalry of France and Spain watched over the birth of Louisiana. Kings and statesmen fostered its early growth, and the treasures of Louis XIV. were liberally expended to make it a success. Every thing which wealth, power, or influence

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